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24.01.2002 US 56322

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(54) Environmentally protected microphone for an active noise control system

(57) An air introduction system (10) includes an active noise control system (22, having an environmentally protected microphone (24). A microphone support structure (26) defines a louvered cage (38) over a microphone reception cavity (40). The microphone (24) is mounted to a circuit board (42) which fits within the microphone reception cavity (40). A cover (42) fits into the cavity (40) to encase the microphone (24) therein. An

open cell foam (60) surround the microphone (24) and a waterproof material (58) encases the foam (60). The waterproof material (58) includes an excess of material such that waterproof material provides for internal air expansion and contraction. By locating the foam (60) between the microphone (24) and the waterproof material (58) improved transmission of acoustic waves is provided which thereby maintains microphone sensitivity.

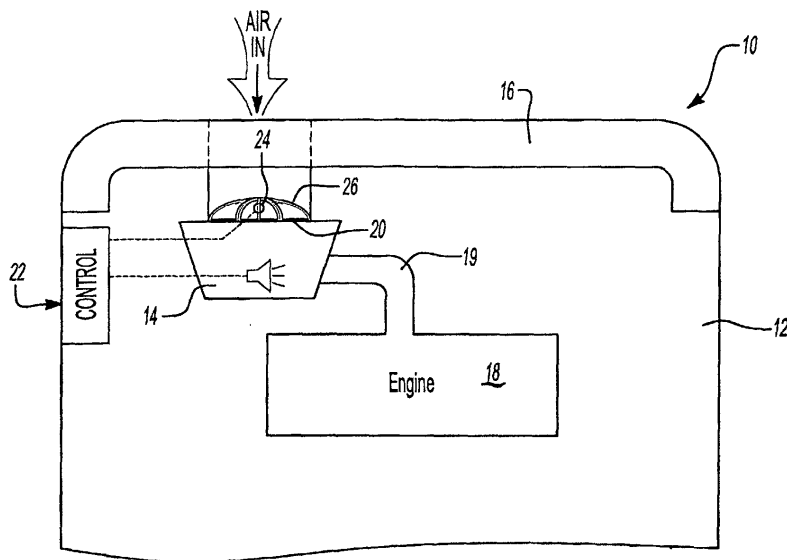


Fig-1

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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 5933

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 827 134 A (CARRIER CORP) 4 March 1998 (1998-03-04)	1,4,5,7,12	G10K11/178
A	* column 8, line 57 - column 9, line 10; figure 12 *	3,11	
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A	-& JP 11 007287 A (SHINKO ELECTRIC CO LTD), 12 January 1999 (1999-01-12) * abstract; figure 3 *	8,11,12,14	
A	----- EP 0 674 097 A (ELECTRONIC SOUND ATTENUATION S) 27 September 1995 (1995-09-27) * column 3, line 37 - line 46; figure 2 *	2	
A	----- US 5 446 249 A (GOODMAN SETH D ET AL) 29 August 1995 (1995-08-29) * column 1, line 24 - line 37 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	----- EP 0 884 471 A (SIEMENS CANADA LTD) 16 December 1998 (1998-12-16) * column 3, line 6 - line 11 * * column 3, line 51 - line 54; figures 1,2 *	8,14	G10K
A	----- US 6 118 878 A (JONES OWEN) 12 September 2000 (2000-09-12) * column 8, line 21 - column 9, line 4; figure 2A *	10	
A	----- US 5 647 314 A (MATSUMURA YASUO ET AL) 15 July 1997 (1997-07-15) * column 2, line 47 - line 56; figure 1 *	15	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 May 2003	Examiner Anderson, A
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-3,6

ANC microphone assembly comprising (a) a waterproof material (eg polyethylene), and (b) a louvered cage for protecting the microphone; the waterproof material includes excess material

2. Claims: 4,5,7

ANC microphone assembly comprising an open cell foam for protecting the microphone, encased by a waterproof material

3. Claims: 8,9

ANC microphone assembly in which the support structure for the microphone has a hemi-spherical basket-like shape; the support structure surrounds an inlet; the microphone is offset from the centre of the support structure

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 07 5933

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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30-05-2003

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82